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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

NGO, HUYEN LE

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 07/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)
	09/442,353	KIKKAWA ET AL.
	Examiner	Art Unit
	Julie-Huyen L. Ngo	2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

4) Claim(s) 1,2,4-6,8,9 and 12-14 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5) Claim(s) ____ is/are allowed.

6) Claim(s) 1,2,4-6,8,9 and 12-14 is/are rejected.

7) Claim(s) 1,2,4-6,8,9 and 12-14 is/are objected to.

8) Claim(s) ____ are subject to restriction and/or election requirement.

Disposition of Claims

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on ____ is: a) approved b) disapproved by the Examiner.

 If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

 1. Certified copies of the priority documents have been received.

 2. Certified copies of the priority documents have been received in Application No. ____.

 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

 a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). ____ .

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ . 6) Other: _____

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The abstract of the disclosure is objected to because it not clearly states which is new in the art to which the invention pertains. Correction is required. See MPEP § 608.01(b).

Claim Objections

Claims 1, 2, 4-6, 8, 9 and 12-14 are objected to because of the following informalities:

In lines 6-9 of claim 1, the recitation calling for "a reflective layer constituted of a same material of a material constituting an electrode of said plurality of switching elements and simultaneously formed during formation of said electrode of said plurality of switching elements on a same plane as a plane of said electrode" is unclear of which electrode of the plurality of switching elements Applicant is referred to. It appears to be inconsistent with what being disclose in the specification and drawings (e.g. fig. 2), which discloses that the reflective layer 23 is formed simultaneously with only the gate electrode 22.

Claims not specifically discussed above are objected as bearing the defect of the claim from which they depend.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4-6, 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagata et al. (US 6,118,505) in view of Ukita et al. (US 5,940,154) and Hiraishi (US 6,172,728B1).

Nagata discloses (figs. 2 and 4) a Liquid Crystal Device comprising all the limitations recited in claims 1, 2, 4-6, 8 and 12 except for:

(Claims 1 and 2) a reflective layer constituted of a same material of a material constituting an electrode of the plurality of switching elements or gate electrode of a thin film transistor, and simultaneously formed during formation of said electrode or the gate electrode and on a same plane as a plane of said electrode or gate electrode.

(Claim 12) at least a rough portion is formed below a reflective layer, and said reflective layer is formed to cover said at least one rough portion.

With respect to claim 1, Ukita et al teach (col. 10, line 55 to col. 11, line 21 and figure 5) forming an aluminum reflective layer 2 on the substrate 1 and under a pixel electrode 6 for reflecting light through a pixel region.

Note that both the gate electrode (2) in Nagata et al. LCD device and the reflective layer (2) in Ukita et al device's are formed of a metal material, and are formed on the respective substrates. Although Nagata does not specifically disclose that gate

electrode 2 is formed of aluminum; however, it is conventional and well known in the art for one of ordinary skill in the art to select aluminum as a material for forming a gate electrode since aluminum is well known as a conductive material with high reflectance, as affirmed by (see Hiraishi col. 9, lines 1-3).

Therefore, it would have been an obvious design choice for one of ordinary skilled in the art at the time the invention was made to select aluminum as a material constituting an electrode of the plurality of switching elements or gate electrode of a thin film transistor in the device of Nagata for high reflectance. Furthermore, it would have been obvious for one of ordinary skilled in the art at the time the invention was made to form a reflective layer constituted of a same material as the gate electrode in Nagata device for simultaneously forming the reflective layer during the formation of the gate electrode (2) and on a same plane as the plane of the gate electrode, i.e. the substrate (1).

Doing so would reduce manufacturing steps, ensure lower fabrication cost and increase fabrication yield. This practice is well known in the art as evidenced by Hiraishi (e.g. figs. 4, 13 and col. 7, line 66 – col. 8, line 25) with the convex portions 11a made of the same material as that of the gate lines 2 in order to minimize the nonuniform wavelength characteristics of the reflected light.

With respect to claim 12, Ukita further teaches forming at least one rough portion below said reflective layer 2. Doing so would significantly reduce light from entering the semiconductor layer 7 of the thin film transistor 20 and thereby would not decrease in

an off-resistance. Accordingly the leakage current would decrease and no deterioration in display grade would occur in the display device.

Therefore, it would have been obvious to one of ordinary skilled in the art to form at least one rough portion on the substrate (1) in the device of Nagata et al., and then form an aluminum reflective layer over the at least one rough portion for reducing light from entering the Nagata et al.'s thin film transistor (7) and for the reasons as set forth above, as taught by Ukita et al.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagata et al. in view of Ukita et al. and Hiraishi as applied to claims 1 and 8 above, and further in view of Seiki et al (US 5,811,835).

It is well known in the art for gate electrodes to compose of a low-resistance metal, such as aluminum (Al), coated with chromium (Cr), tungsten (W), titanium (Ti), tantalum (Ta), or some other metal whose melting point is higher than that of aluminum such as neodymium or with an aluminum alloy so that a hillock, blister, etc. of aluminum can be effectively prevented, as evidenced by Seiki et al (col. 1, lines 25-32 and col. 3, lines 30-40).

Therefore, it would have been obvious to one of ordinary skilled in the art to form the reflective layer and/or the gate electrode in the device of Nagata in view of Ukita and Hiraishi from an alloy of aluminum and neodymium for the reasons set forth above, as taught by Seiki et al.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagata et al. in view of Ukita et al. and Hiraishi as applied to claims 12 above, and further in view of Kimura (US 5,610,741).

Kimura teaches (figures 13&14 and col. 15, line 61 to col.16, line 36) patterning a photo resist film or insulation film to form rough portion(s) on a surface of a substrate and below a reflective layer (col. 16, lines 63-67) for effectively reflecting light. Also, it is well known in the art to form a photo resist film of a material, which is not deformed in a heating process performed later and which does not contain high density impurities adversely affecting a liquid crystal display.

Therefore, it would have been obvious to one of ordinary skill in the art to pattern rough portion(s) below the reflective layer (2), in the device of Nagata et al. in view of Ukita and Hiraishi from a photoresist film or an insulation film for the reasons set forth above, as taught by Kimura.

Response to Arguments

Applicant's arguments filed on May 27, 2003 (paper no. 23) have been fully considered but they are not persuasive.

Applicants' arguments:

1) Neither Nagata nor Ukita, whether taken alone or in any combination, teach or suggest the following features:

"a reflective layer is constituted of a same material of as a material constituting an electrode or gate electrode of a plurality of switching elements, and simultaneously

formed during formation of said electrode or the gate electrode and on a same plane as a plane of said electrode or gate electrode."

- 2) Nagata does not teach any material or location for a reflective layer
- 3) Ukita neither teaches that the reflective layer is formed of a same material as an electrode of a switching element nor that the reflective is formed on a same plane as an electrode of a switching element.
- 4) Ukita discloses a reflection plate 2 that is positioned below a dielectric film layer 3 and not in the same plane as an electrode of a switching element (figure 3).
- 5) One of ordinary skill in the art would not reasonably combine the teachings of Nagata and Ukita to produce Applicants' claimed invention and would have no motivation to do so due to the structural differences between a transmission type LCD device of Nagata and a reflective type LCD device of Ukita.

Examiner's responses:

- 1) In response to Applicant's argument in paragraphs 1 and 4 above, Applicants are to recognize that obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

The rejection as set forth above are based on combinations of references as follow:

The Examiner relies on the embodiment of figure 5 in Ukita et al reference for the motivation to form a reflective layer 2 on a substrate and over at least one rough portion formed below the reflective layer, and under the pixel electrode 6 for reflecting light through the pixel region in the device of Nagata. Further more, it is in the knowledge generally available to one of ordinary skill in the art to form a reflective layer constituted of a same material of as a material constituting an electrode or gate electrode of a plurality of switching elements or thin film transistor, and simultaneously formed during formation of said electrode or the gate electrode and on a same plane as a plane of said electrode or gate electrode.

Reference of Hiraishi has been provided to further show that it is well known in the art to simultaneously form a gate electrode and another electrode/layer/convex portion of the same material such as aluminum for high reflectance and minimizing the nonuniform wavelength characteristics of the reflected light. Doing so would reduce manufacturing steps, ensure lower fabrication cost and increase fabrication yield (see e.g. figs. 4, 13 and col. 7, line 66 – col. 8, line 25).

Therefore, the cited references as combined by their motivations fully meet all the limitations recited in the rejected claims.

2) in response to Applicant's argument in paragraphs 2 and 3 above, Applicants arguments were against the reference individually. Applicant is to note that one cannot

show nonobviousness by attacking a reference individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

3) In response to Applicant's argument in paragraph 5 above, Applicants are to note that Nagata not only disclose a transmission type LCD device but also a reflective type LCD device (see col. 4, lines 51-52), therefore it would have been obvious for one of ordinary skill in the art to modify Nagata LCD device by the teaching of Ukita as set forth above in the rejection and responses.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Julie Ngo, whose telephone number is (703) 305-3508.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0956.

July 7, 2003


Julie Huyen L. Ngo

**Patent Examiner
Art Unit 2871**